

# **Morbidity Patterns and Associated Factors among Elderly People: The Case of Sunkoshi Rural Municipality, Nepal**

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## **Abstract**

The rapidly increasing elderly population in Nepal is the most significant emerging demographic phenomenon. Multimorbidity is common among the elderly and its prevalence increases with age. This study aims to assess the chronic conditions and the demographic and socioeconomic factors that influence morbidity among the elderly. A cross-sectional study was carried out in the Sunkoshi rural municipality of Sindhuli district from December 2021 to January 2022 with 413 elderly people aged 60 and older using a structured questionnaire. Multinomial logistic regression was used for data analysis. About 27% of the elderly suffer from gastritis, followed by high blood pressure (27%), arthritis (24%), asthma (18%), and diabetes (10%). Seventy-seven percent of the elderly reported at least one morbidity and 41% have two or more morbidities. More than one-fifth of elderly people have no morbidity. In the multinomial logistic regression, moderate (RRR=3.31, 95% CI: 1.15-4.63) and poor (RRR=11.91, 95% CI: 1.00-141.83) self-reported health status was significantly associated with one morbidity. A joint family (RRR=2.01, 95% CI: 1.08-3.74), moderate (RRR=3.07, 95% CI: 1.52-6.21) or poor (RRR=32.05, 95% CI: 2.53-405.94) self-reported health status was significantly associated with two or more morbidity. Those aged 80 years or over, those who belonged to the hill Janajati, and those who consumed alcohol were less likely to have multimorbidity. Concerned authorities should consider expanding health services in order to improve the health status of the elderly.

*Keywords:* chronic conditions, elderly people, multimorbidity, multinomial logistic regression, Sunkoshi Municipality

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## **Background**

Population aging is currently a major concern in developing countries. Most countries are experiencing rapid population aging (United Nations, 2020). Aging is a complex process that causes biological, social, and psychological changes in an individual. In the world, the number of people aged 60 years and over was 202 million in 1950. It increased to 1.05 billion by 2020 and is expected to reach 2.08 billion by 2050 (United Nations, 2019).

Nepal is experiencing rapid population aging in recent years (National Planning Commission & UNICEF, 2017). Declining fertility and mortality rates and increasing life expectancy have been the leading cause of population ageing (Shrestha, 2000). The Senior Citizens Acts 2063 (2006) defines senior citizens as people who are aged 60 years and over. The population aged 60 years and over was reported to be 0.62 million in 1971 (Central Bureau of Statistics [CBS], 1987), 1.07 million in 1991 (CBS, 1993), 2.15 million in 2011 (CBS, 2012), 2.70 million in 2021 and it will reach to 3.4 million by 2031 (CBS, 2014). Between 1971 and 2011, the size of the older population of Nepal increased by more than 1.5 million. During this period, the number of older populations increased by 43 percent. The proportion of older people in Nepal has steadily increased from 5.2 percent in 1971 to 8.1 percent in 2011 and is expected to reach 10.4 percent by 2031 (CBS, 2014).

Elderly people differ from other population groups in terms of socioeconomic status, lifestyle, presence of diseases, cognitive functioning, and dependency on family and community care (Moncatar & Seino, 2019; Tyagi & Paltasingh, 2017). From a health perspective, old age is characterized by an increased risk of many health disorders, a higher likelihood of multimorbidity, low levels of physical activity, increased need for health and long-term care services, and an increased body mass index (World Health Organization, 2015).

The elderly face unique health problems that are different from those of adults or young. In Nepal, an increasing number of elderly people are suffering from various health problems (Shrestha, 2013) such as malnutrition, chronic diseases, and lack of proper utilization of health services. The majority of diseases that occur in old age are chronic, such as cardiovascular disease, arthritis, high blood pressure, stroke, diabetes, cataracts, cancer, and chronic infections. Most often, the elderly suffers from multiple chronic conditions, including vision impairment, hearing loss, and speech deterioration. Most of the available previous studies on the elderly have focused on health service utilization among the elderly. There are few studies on morbidity patterns among older people in Nepal. Due to the increasing prevalence of multimorbidity in the elderly,

there is a need for a better understanding of morbidity conditions and factors affecting morbidity. Therefore, the objectives of this study are to assess the chronic diseases of the elderly in the rural community of Sunkoshi and examine the demographic and socioeconomic factors affecting morbidity.

### **Methods**

This study adopted a cross-sectional study design in the rural community of Sunkoshi, Sindhuli District, Nepal. Sindhuli District is one of the thirteen districts of Bagmati Province, covering a total area of 154.68 square kilometers and accessing the BP highway. According to the 2011 census, the population size of Sunkoshi rural municipality was 21,473, with 99,88 males and 11,485 females, whereas in 2021, its population was 18,136 with 87,72 males and 93,64 females, accounting 48.4% males and 51.6% females (CBS, 2022). Between 2011-2021, the population size of this rural municipality decreased by 16%. The main caste/ethnicity residing in this rural municipality are Chhetri, Tamang, Magar, Brahman, Newar, Sarki, and Damai. In Sunkoshi rural municipality, there were 2,247 older people with 1,080 males and 1,166 females. The sex ratio of older people was 92.6.

### **Data Sources**

This study uses primary data collected through a household survey. The data for this study was obtained through structural interviews with older people aged 60 and over. The questionnaire was developed after reviewing the World Health Organization Study of Global Ageing and Adult Health (SAGE) Wave 1 Individual Questionnaire, Questionnaire on 2018 Longitudinal Study of Ageing and Health in the Philippines (Cruz et al., 2018), and Questionnaire of Household Survey on Health and Social Care Needs Assessment of Older People (Bista et al., 2012).

### **Sample Size**

The sample size of this study was determined by using the Epi-Info software with the following parameters: proportion of health service utilization by elderly people (62%), 95% confidence interval, the margin of error 5%, design effect 1.2, and non-response rate 10%. The total elderly population in Sunkoshi rural municipality was 2246 according to the 2011 census. With the assumptions of the values of the parameters, the sample size was calculated as 413.

## **Sample and Sample Design**

A two-stage sample design was used in this study. To begin, all wards in Sunkoshi rural municipality were chosen as primary sampling units (PSUs). In the second, the required sample size per ward was determined proportionally based on the number of older people aged 60 and over in the wards. We consulted the residents of the central area of the ward to identify eligible respondents. We began the interview with an eligible respondent from the central catchment area of the ward. We continued to visit households in a clockwise direction until we had reached the required number of older people. Only one eligible respondent from each household was interviewed. If any eligible respondent was not available in a household, the nearest household with an eligible respondent was substituted. If more than one eligible respondent lived in the same household, only one was randomly selected.

## **Study Variables**

Based on the previous studies, some demographic and socioeconomic factors such as the age of respondents, sex, marital status, caste/ethnicity, religion, education, working status, family types, tobacco use, and alcohol use, working status, household status, living arrangement, the decision for treatment, and economic source of living, self-reported health status, morbidity, activities of daily living, and functional difficulty were considered as independent variables.

Morbidity condition was taken as a dependent variable. It was categorized into three groups. The elderly with no morbidity was considered 'no morbidity' and coded as '0', those with one morbidity were considered as 'one morbidity' and coded as '1', and two or more morbidities were considered 'multimorbidity' and coded as '2'.

## **Data Analysis**

STATA version 15.1 statistical software was used for data analysis. A descriptive analysis is performed to assess the demographic and socioeconomic differentials in the prevalence of morbidity among the elderly. Logistic regression analysis was performed to examine the factors influencing morbidity among the elderly.

## **Results**

Demographic and socioeconomic characteristics of the elderly are given in Table 1. The table shows that about 45 percent of the elderly are in the age group 60-69 years and 39 percent belong to age group 70-79. Males account for more than half of the elderly. Almost two-thirds of the elderly (62%) are married. The Hill caste is the most numerous, accounting for 51 percent of the elderly. Hindus account for about 89 percent of the elderly.

**Table 1**

*Demographic and socio-economic characteristics of elderly*

|                        | <b>Background characteristics</b> | <b>Percentage</b> | <b>No.</b> |
|------------------------|-----------------------------------|-------------------|------------|
| Age group              | 60-69                             | 44.6              | 184        |
|                        | 70-79                             | 39.0              | 161        |
|                        | 80 and above                      | 16.5              | 68         |
| Sex                    | Male                              | 51.6              | 213        |
|                        | Female                            | 48.4              | 200        |
| Current marital status | Married                           | 61.5              | 254        |
|                        | Other                             | 38.5              | 159        |
|                        |                                   |                   |            |
| Caste/Ethnicity        | Hill caste                        | 50.6              | 209        |
|                        | Hill Janajati                     | 39.5              | 163        |
|                        | Hill Dalits                       | 9.9               | 41         |
| Religion               | Hindu                             | 88.9              | 367        |
|                        | Other                             | 11.1              | 46         |
| Level of education     | No education                      | 69.2              | 286        |
|                        | Primary                           | 24.7              | 102        |
|                        | Secondary                         | 6.1               | 25         |
| Living arrangement     | Living alone                      | 9.7               | 40         |
|                        | Living with spouse and children   | 21.8              | 90         |
|                        | Living with son/daughter-in-law   | 63.9              | 264        |
|                        | Living with others                | 4.6               | 19         |
| Type of family         | Nuclear family                    | 34.4              | 142        |
|                        | Joint family                      | 65.6              | 271        |
| Current working status | Working                           | 48.7              | 201        |
|                        | Not working                       | 51.3              | 212        |
| Wealth index           | Poorest                           | 20.3              | 84         |
|                        | Poorer                            | 19.9              | 82         |
|                        | Middle                            | 19.9              | 82         |
|                        | Richer                            | 20.1              | 83         |
|                        | Richest                           | 19.9              | 82         |
| Tobacco use            | No                                | 64.4              | 266        |
|                        | Yes                               | 35.6              | 147        |
| Alcohol user           | Not user                          | 78.7              | 325        |
|                        | User                              | 21.3              | 88         |
| <b>Total</b>           |                                   | <b>100.0</b>      | <b>413</b> |

*Source: Field survey, 2021*

More than two-thirds of the elderly (69%) had no education. About 64 percent of the elderly live with their son/daughter-in-law. About two-thirds (66%) of the elderly live with a joint family. More than one-half of the elderly are not working. Each of the five wealth quintiles accounts for nearly 20 percent of the elderly. Tobacco and alcohol are consumed by more than one-third and one-fifth of the elderly, respectively. Twenty-three percent of elderly people have no morbidity followed by 36 percent have one morbidity, and 41 percent have multiple morbidities.

Old age is associated with illness and health complications. The chronic condition is determined by an Individual's self-reporting to the question "Has a health professional or doctor ever told you that you have ...?" Gastritis, high blood pressure, arthritis, asthma, and diabetes are the most common chronic conditions among the elderly.

**Table 2**

*Percentage distribution of elderly people by chronic health problems*

| <b>Health problems</b>    | <b>Percentage</b> | <b>N</b> |
|---------------------------|-------------------|----------|
| <b>Chronic conditions</b> |                   |          |
| Gastritis                 | 27.4              | 113      |
| High blood pressure       | 26.9              | 111      |
| Arthritis                 | 23.5              | 97       |
| Asthma                    | 18.4              | 76       |
| Diabetes                  | 9.9               | 41       |
| Cataracts/Glaucoma        | 7.0               | 29       |
| Heart disease             | 5.3               | 22       |
| Other                     | 5.6               | 23       |
| <b>Morbidity</b>          |                   |          |
| No morbidity              | 23.0              | 95       |
| One morbidity             | 35.6              | 147      |
| Multimorbidity            | 41.4              | 171      |

*Source: Field survey, 2021*

About 27 percent of the elderly suffer from gastritis, followed by high blood pressure (27%), arthritis (24%), and asthma (18%). About 10 percent of the elderly have diabetes, 7% have cataracts/glaucoma, and nearly 5% have heart disease. It is found that 23 percent of elderly people have no morbidity, about 36 percent have one morbidity, and 41 percent have multiple morbidities.

The results of the multinomial logistic regression model are presented in Table 3. In this model, two separate comparisons are made. First, elderly people with single morbidity are compared to those who do not have morbidity. Second, the elderly with multimorbidity are compared to those who do not have morbidity. General health status is significantly associated with the adjusted likelihood of having one morbidity, compared to not having morbidity. The relative risk of having single morbidity was 2.31 times higher among those elderly who have moderate health status compared to those with good health status. The relative risk of a single morbidity was 11.91 times higher among the elderly with poor health compared to those with good health.

The relative risk of having multimorbidity compared to not having morbidity was 77% lower for the elderly aged 80 years or over than in the elderly aged 60-69 years. Similarly, the relative risk of having multimorbidity relative to not having morbidity was 54% lower for elderly Hill Janajati compared to the elderly Hill caste. When compared to the nuclear family, the elderly living in a joint family was significantly a higher relative risk of having multimorbidity (RRR=2.01, 95% CI:1.08-3.74). Alcohol consumption was associated with a 69% lower risk of multimorbidity among the elderly compared with the elderly who did not consume alcohol. The relative risk of having multimorbidity was 3.07 times higher for those with moderate self-rated health and 32.05 times higher for those with poor self-rated health status compared to those who reported good health.

## **Discussion**

This study shows that gastritis, high blood pressure, arthritis, and asthma are the most prevalent chronic conditions. These findings are consistent with previous studies conducted in Bharatpur municipality of Chitwan district (Baral & Sapkota, 2018), Pakhribas village development committee of Koshi zone (Gupta et al., 2016), Pokhara Lekhnath metropolitan (Acharya et al., 2019), Thabang rural municipality of Rolpa district (Acharya Samadarshi et al., 2022) and Pokhara old age homes (Dhungana & Dhungana, 2020).

The result of the study indicates a higher prevalence of morbidity among the elderly in the study area. The prevalence of chronic morbidity in the study area is higher than in India (Chauhan et al., 2022), Myanmar (Aye et al., 2019), and Nepal (Sanjel et al., 2012). A study in Bharatpur municipality of Chitwan district found a higher prevalence of chronic morbidity among the elderly (Baral & Sapkota, 2018). Another study conducted in the rural areas of Sunsari and Morang districts found that nearly half (49%) of the elderly aged 60 years and over people had at least one morbidity (Yadav et al., 2021).

**Table 3**

*Factors associated with having one morbidity and multimorbidity compared to no morbidity.*

|                       |               | No morbidity vs<br>One morbidity |               | No morbidity vs<br>Multimorbidity |               |
|-----------------------|---------------|----------------------------------|---------------|-----------------------------------|---------------|
|                       |               | RRR                              | 95% CI        | RRR                               | 95% CI        |
| Age group             | 60-69         | 1.00                             |               | 1.00                              |               |
|                       | 70-79         | 1.26                             | 0.64 - 2.48   | 1.41                              | 0.72 - 2.76   |
|                       | 80 and above  | 0.44                             | 0.17 - 1.14   | 0.23**                            | 0.09 - 0.60   |
| Sex                   | Male          | 1.00                             |               | 1.00                              |               |
|                       | Female        | 1.39                             | 0.71 - 2.72   | 1.99                              | 0.98 - 4.04   |
| Marital status        | Married       | 1.00                             |               | 1.00                              |               |
|                       | Other         | 0.87                             | 0.45 - 1.68   | 0.57                              | 0.28 - 1.17   |
| Caste/ethnicity       | Hill caste    | 1.00                             |               | 1.00                              |               |
|                       | Hill Janajati | 0.53                             | 0.26 - 1.06   | 0.46*                             | 0.22 - 0.93   |
|                       | Hill Dalit    | 1.35                             | 0.43 - 4.20   | 1.40                              | 0.41 - 4.80   |
| Religion              | Hindu         | 1.00                             |               | 1.00                              |               |
|                       | Other         | 2.34                             | 0.90 - 6.05   | 1.91                              | 0.63 - 5.77   |
| Education level       | No education  | 1.00                             |               | 1.00                              |               |
|                       | Primary       | 1.05                             | 0.48 - 2.30   | 1.05                              | 0.50 - 2.23   |
|                       | Secondary     | 2.60                             | 0.53 - 12.86  | 2.66                              | 0.54 - 13.15  |
| Type of family        | Nuclear       | 1.00                             |               | 1.00                              |               |
|                       | Joint         | 1.37                             | 0.74 - 2.52   | 2.01*                             | 1.08 - 3.74   |
| Working status        | Working       | 1.00                             |               | 1.00                              |               |
|                       | Not working   | 0.72                             | 0.34 - 1.52   | 1.09                              | 0.52 - 2.30   |
| Wealth index          | Poorest       | 1.00                             |               | 1.00                              |               |
|                       | Poorer        | 1.86                             | 0.81 - 4.30   | 1.85                              | 0.75 - 4.61   |
|                       | Middle        | 1.16                             | 0.47 - 2.86   | 1.21                              | 0.48 - 3.02   |
|                       | Richer        | 1.06                             | 0.42 - 2.67   | 1.93                              | 0.76 - 4.88   |
|                       | Richest       | 1.15                             | 0.43 - 3.05   | 1.98                              | 0.71 - 5.48   |
| Tobacco use           | No            | 1.00                             |               | 1.00                              |               |
|                       | Yes           | 0.80                             | 0.42 - 1.53   | 0.64                              | 0.33 - 1.23   |
| Alcohol use           | No            | 1.00                             |               | 1.00                              |               |
|                       | Yes           | 0.53                             | 0.25 - 1.11   | 0.31**                            | 0.14 - 0.70   |
| General health status | Good          | 1.00                             |               | 1.00                              |               |
|                       | Moderate      | 2.31*                            | 1.15 - 4.63   | 3.07**                            | 1.52 - 6.21   |
|                       | Poor          | 11.91*                           | 1.00 - 141.83 | 32.05**                           | 2.53 - 405.94 |
|                       | Constant      | 1.37                             | 0.48 - 3.93   | 0.82                              | 0.29 - 2.34   |



This study found that age group, caste/ethnicity, type of family, alcohol consumption, and general health status were all significantly associated with multimorbidity, but only general health status was significantly associated with one morbidity. The oldest elderly people had a lower risk of multimorbidity.

### **Conclusion**

The growing number of elderly people is expected to cause major health issues in Nepal in the coming years. The elderly are at a high risk of developing a variety of chronic diseases. In the study area, the most common chronic health problems among the elderly were gastritis, hypertension, arthritis, asthma, and diabetes.

Single morbidity is most influenced by general health status, whereas multimorbidity is influenced by age group, caste/ethnicity, type of family, alcohol consumption, and general health status of the elderly. Health is a primary concern for healthy and successful aging. Hence, concerned authorities should consider improving the health status of the elderly by expanding health services for the elderly.

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